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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,214	03/04/2002	Joseph Paul Kuczynski	ROC919980236US2	5014

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EXAMINER

HARAN, JOHN T

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 05/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/090,214	Applicant(s) KUCZYNSKI, JOSEPH PAUL	
	Examiner John T. Haran	Art Unit 1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/22/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1733

DETAILED ACTION

This action is in response to the amendments and arguments filed on 3/22/04.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 19-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 19 is a negative limitation and is considered new matter since there is no support for it in the specification as originally filed. The specification broadly states on page 7 that the microspheres are made from ceramic material, such as inert alkali aluminosilicates. One skilled in the art at the time the invention was made would have understood that to include all alkali aluminosilicates, including lithium aluminosilicates. There is no suggestion that applicant had the intent of excluding lithium aluminosilicates as possible alkali aluminosilicates for use in the present application. The specification does not adequately describe excluding lithium aluminosilicates to convey to one of ordinary skill in the art, at the time the application was filed, that the inventors had possession of positively excluding lithium aluminosilicates.

Art Unit: 1733

Claim 20 is also new matter because there is no support for in the specification for the ceramic microspheres to contain the listed compounds. Additionally, one skilled in the art would not have understood the listed compounds to be alkali aluminosilicates. Alkali aluminosilicates contain an alkali metal (Li, Na, K, Rb, Cs, Fr), aluminum, and silicon. None of the compounds listed contain all three required components of an alkali aluminosilicate. The specification does not adequately describe the microspheres to convey to one of ordinary skill in the art that the inventors, at the time the application was filed, had possession of the microspheres consisting of the claimed list of compounds.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 is indefinite because it refers to the claimed list as alkali aluminosilicates however alkali aluminosilicates contain an alkali metal (Li, Na, K, Rb, Cs, Fr), aluminum, and silicon. None of the compounds listed contain all three required components of an alkali aluminosilicate. The claim is indefinite since the claimed compounds are not alkali aluminosilicates.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-11, 15-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hogerton et al (U.S. Patent 5,714,252) in view of Kunitomoto et al (U.S. Patent 5,622,590) taken with Plamthottam et al (U.S. Patent 5,244,962).

Hogerton et al is directed to a method of adhesive bonding wherein an IC chip is bonded to a substrate with an insulating adhesive material, such as epoxy resin, wherein the adhesive material is provided on either the substrate or IC chip, the IC chip and substrate are pressed together with the adhesive in between and the adhesive is cured using well known techniques including use of ultraviolet light (photocuring) (Column 6, lines 44-57 and Column 9, lines 7-8 and 41-51). Hogerton et al is silent towards having an effective amount of microspheres as fillers in the adhesive.

Kunitomoto et al is directed to a method of adhesive bonding an semiconductor chip and a substrate with adhesive wherein the adhesive is an epoxy resin with ceramic filler, such as aluminum nitride or silicon carbonate, that has a high thermal conductivity and therefore reduces the degree of thermal expansion of the resin and reduces stress in the semiconductor device (Column 5, lines 28-38 and Column 6, line 61 to Column 7, line 2). Kunitomoto et al teaches that the ceramic filler particles have a diameter of 5 um (Column 9, lines 52-54). One skilled in the art would have readily appreciated since

Art Unit: 1733

the particles have a diameter they are spherical and alternatively one skilled in the art would have readily appreciated that it would have been obvious to have microsphere ceramic particles as it is well known and conventional in the art to fill adhesives with ceramic microspheres, as shown for example in Plamthottam et al (Column 5, lines 35-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to fill the epoxy adhesive of Hogerton with ceramic microspheres in the method of Hogerton as suggested in Kunitomoto et al in order reduce the degree of thermal expansion and thereby reduce the stress induced in the semiconductor device due to heat generated during bonding and operation of the device. It is additionally noted that the specification teaches that ceramic microspheres do not change the cure speed of the adhesive and absent any teachings to the contrary, it would have been obvious to one skilled in the art that the ceramic microspheres suggested in Kunitomoto et al would be expected to have the same effect.

Regarding claims 2-6, one skilled in the art would have readily appreciated fully curing the adhesive in order to ensure adequate adhesion and that the dose (intensity) and duration of the exposure to ultraviolet radiation would depend upon the materials worked upon. It would have been within the purview and mechanical skill of one skilled in the art to determine the necessary dose and duration of the uv radiation exposure necessary to fully cure the adhesive.

Regarding claim 7, Kunitomoto teaches the microspheres are ceramic.

Regarding claim 8, one skilled in the art would have readily appreciated that the ceramic microspheres of Kunitomoto are solid and additionally using solid ceramic

Art Unit: 1733

microspheres is obvious and well known and conventional, as shown for example in Plamthottam et al (Column 5, lines 35-40).

Regarding claims 9-11, Kunitomoto et al teaches that preferably the microspheres are 5um in diameter and are 40 wt% of the adhesive composition (Column 9, lines 52-55). Additionally one skilled in the art would have readily appreciated that wt% and diameter of the microspheres would depend upon a variety of factors including the microsphere material and the material of the chip and substrate being bonded. It would have been within the purview and mechanical skill of one skilled in the art to determine the necessary diameter and wt% of the microspheres.

Regarding claim 15, it appears from applicant's disclosure that adding the microspheres to the adhesive makes the adhesive composition pseudoplastic and one skilled in the art would readily appreciate that adding the ceramic microspheres to the epoxy resin of Hogerton et al would have the same effect of making the adhesive composition pseudoplastic. The adhesive composition of Hogerton et al, as modified above, is taken as being pseudoplastic.

Regarding claim 16, Kunitomoto et al teaches that adding the ceramic microspheres to the epoxy adhesive results in the adhesive composition having a lower thermal coefficient of expansion than the adhesive alone (Column 5, lines 28-38 and Column 6, line 61 to Column 7, line 2). The adhesive composition of Hogerton et al, as modified above, has a lower thermal coefficient of expansion than the adhesive alone.

Regarding claim 18, Hogerton et al teaches applying the adhesive in either liquid or sheet form (Column 6, lines 47-48). One skilled in the art would have readily

Art Unit: 1733

appreciated that applying the adhesive as a liquid would necessarily involve flowing because whatever the dispensing mechanism for the liquid adhesive: extruder, screen printer, sprayer, etc.; it would involve the liquid adhesive flowing because the liquid adhesive could not be applied without it flowing to some degree. It is noted that applicant does not teach any examples of flowing in the disclosure but it is examiner's position that any application of liquid adhesive involves flowing. It would have been obvious to one of ordinary skill in the art at the time the invention was made that using a liquid adhesive composition in the method of Hogerton et al involves flowing of the adhesive in the application process.

7. Claims 12-14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hogerton et al (U.S. Patent 5,714,252) in view of Kunitomoto et al (U.S. Patent 5,622,590) taken with Plamthottam et al (U.S. Patent 5,244,962) as applied to claims 1-11, 15-16, and 18 above, and further in view of "3M and Zeelan Industries Announce New White Zeeospheres Microspheres" and WO 99/00250.

Hogerton et al and Kunitomoto et al are relied upon for the teachings noted above and are silent towards using an alkali alumino silicate as the ceramic filler.

The 3M article teaches a family of ceramic Zeeospheres microspheres, W610, W410, and W210 that can be used as fillers in adhesives. WO 99/00250 teaches that these W410 and W210 Zeeospheres are alkali aluminosilicates (pages 13-14). One skilled in the art would have readily appreciated using other known ceramic microspheres as fillers in adhesive the adhesive of Hogerton et al, as modified above. It

Art Unit: 1733

would have been obvious to one of ordinary skill in the art at the time the invention was made to use other known ceramic microspheres as fillers in the adhesive in the method of Hogerton et al, as modified above.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogerton et al (U.S. Patent 5,714,252) in view of Kunitomoto et al (U.S. Patent 5,622,590) taken with Plamthottam et al (U.S. Patent 5,244,962) and also in view of Belke, Jr. et al (U.S. Patent 5,783,867).

Hogerton et al is directed to a method of adhesive bonding wherein an IC chip is bonded to a substrate with an insulating adhesive material, such as epoxy resin, wherein the adhesive material is provided on either the substrate or IC chip, the IC chip and substrate are pressed together with the adhesive in between and the adhesive is cured using well known techniques including use of ultraviolet light (photocuring) (Column 6, lines 44-57 and Column 9, lines 7-8 and 41-51). Hogerton et al is silent towards having an effective amount of microspheres as fillers in the adhesive.

Kunitomoto et al is directed to a method of adhesive bonding an semiconductor chip and a substrate with adhesive wherein the adhesive is an epoxy resin with ceramic filler, such as aluminum nitride or silicon carbonate, that has a high thermal conductivity and therefore reduces the degree of thermal expansion of the resin and reduces stress in the semiconductor device (Column 5, lines 28-38 and Column 6, line 61 to Column 7, line 2). Kunitomoto et al teaches that the ceramic filler particles have a diameter of 5 μm (Column 9, lines 52-54). One skilled in the art would have readily appreciated since

Art Unit: 1733

the particles have a diameter they are spherical and alternatively one skilled in the art would have readily appreciated that it would have been obvious to have microsphere ceramic particles as it is well known and conventional in the art to fill adhesives with ceramic microspheres, as shown for example in Plamthottam et al (Column 5, lines 35-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to fill the epoxy adhesive of Hogerton with ceramic microspheres in the method of Hogerton as suggested in Kunitomoto et al in order reduce the degree of thermal expansion and thereby reduce the stress induced in the semiconductor device due to heat generated during bonding and operation of the device. It is additionally noted that the specification teaches that ceramic microspheres do not change the cure speed of the adhesive and absent any teachings to the contrary, it would have been obvious to one skilled in the art that the ceramic microspheres suggested in Kunitomoto et al would be expected to have the same effect.

Hogerton et al teaches applying the adhesive in either liquid or sheet form (Column 6, lines 47-48), but is silent towards extruding the adhesive, however such is a well known and conventional method for applying adhesive in the art, as shown for example in Belke, Jr. et al (Column 5, lines 43-54). One skilled in the art would have readily appreciated using a well known and conventional application means, such as extrusion, for applying the adhesive. It would have been obvious to one of ordinary skill in the art at the time the invention was made to extrude the adhesive composition with microspheres onto either the substrate or IC chip in the method of Hogerton et al as is well known and conventional in the art.

Response to Arguments

9. Applicant's arguments filed 3/22/04 have been fully considered but they are not persuasive.

Applicant argues that none of the references suggest that the microspheres do not change a cure speed of the adhesive. The specification indicates that the objective of the application is to replace fused silica with ceramic microspheres as the adhesive filler because the fused silica slowed the cure speed of the adhesive (See page 2). The application teaches using ceramic microspheres, in general, indicating that any type of ceramic would accomplish the goal of the application. Accordingly it is expected that ceramic microspheres, such as those taught in Kunitomoto, will not effect the cure speed of the adhesive absent any teachings to the contrary.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

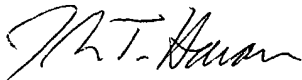
Art Unit: 1733

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

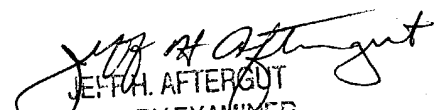
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(571) 272-1217**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John T. Haran



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